

Narinder Singh Kapany — The Indian Physicist who Bent Light

Very few people have the luck to live long enough to see how their work revolutionises the world. The Indian physicist Narinder Singh Kapany is one of those fortunate people. In 1953, he designed and manufactured a glass wire capable of transporting light, which he later coined fibre optics, an invention that has transformed all our lives. Without it, the Internet and modern telecommunications would not be possible, nor the most advanced biomedical instrumentation, nor the efficient use of solar energy. With fibre optics, this genius of physics-in addition to being an entrepreneur and inventor-achieved what his teachers had told him was impossible: to bend light.

Narinder Kapany was born on 31 October 1926 in Moga, Punjab (north India) to a wealthy Sikh family. He studied physics at the University of Agra while working in a factory for the design and manufacture of optical instruments, where he began to be interested in the technological applications of the theories he studied.

After graduating in 1952, he moved to London to study for a doctorate at the Imperial College in London with the prestigious British physicist Harold Hopkins, a researcher in the field of optics. Kapany sought to achieve a system that would allow the use of light as a means of transmitting information, picking up the baton from earlier celebrated scientists. One of these was the Frenchman Claude Chappe, who in the 18th century developed a kind of optical telegraph, considered the first attempt to use light as a vehicle for the exchange of information. His idea was to position towers facing each other but separated by dozens of kilometres and to use mirrors to reflect messages encoded in the form of light.

A beam of light through glass wires

Almost a century before, the Irishman John Tyndall discovered that light could travel within a jet of water. Starting from these earlier ideas, Kapany undertook the task of developing a material through which light could travel, adapting itself to its shape and curvature. In 1953, while working on his thesis, he achieved his goal in a nascent form.

In 1954, he published his breakthrough in the journal Nature, where he explained how he had directed a beam of light through a set of 75-centimetre-long glass wires while hardly losing any signal in the transmission. However, those first fibres had a problem: the light dissipated and could not cover distances greater than nine metres. But even so, Kapany had opened the door for many other researchers to



work in that field and perfect his invention, which he later dubbed "fibre optics" in an article in Scientific American.

Optical fibre is one of the most used materials in because of its lightness, flexibility and resistance. An optical fibre is a very long and flexible glass filament with a thickness that is only twice that of a human hair. Encoded laser light signals can travel along this very fine wire, which upon reaching their destination are decoded, thereby reconstructing a message. In general, these fibres are gathered into wider

bundles surrounded by a plastic sheath. Nowadays, it is one of the most used materials in telecommunications because of its lightness, flexibility and resistance and because of the economics of the raw material from which it is produced: sand.

A revolution in telecommunications

Kapany had laid the foundations for a veritable revolution in the world of telecommunications. After obtaining his Doctorate in 1955, he continued his career in the United States, where he has lived ever since. The explosion of research related to fibre optics led Kapany to publish in 1967 the book Optical Fibres. Principles and applications, a world reference in the field of optics. The applications of his invention increased exponentially and in 1977 the first telephone connection by optical fibre was achieved.

With the contributions of other scientists, Kapany's glass filaments evolved to be able to transport a huge flow of data at great speeds and over enormous distances: today, 95per cent of Internet traffic travels along thick submarine cables, composed of an infinity of optical fibres. But fibre optics has also transformed other disciplines. In medicine it has allowed the development of laryngoscopes, bronchoscopes and laparoscopes with which to explore the interior of the human body. It is also used in sensors to measure voltage, temperature or pressure, and one of its latest and varied applications makes it possible to capture solar energy with high efficiency.

Narinder Kapany was part of the National Inventors Council in United States, a Department of Commerce Advisory Board, consisted of prominent scientists and engineers.

Kapany, considered the father of fibre optics, devoted much of his career to teaching at the University of California and at Stanford University. The author of numerous patents and scientific articles, he has founded several companies focused on the technological transfer of this knowledge.

True to his origins, he has been a leading promoter in the US of Sikhism, a monotheistic religion whose male practitioners are easily recognised by always covering their hair with a turban, which they never cut. In 1967, Kapany created the Sikh Foundation and also treasures an important personal collection of Sikh art.

Fortune magazine recognised Kapany in 1999 as one of seven anonymous heroes in its Twentieth Century Businessmen special.

Kids Craft: Cereal Box Aquarium



You Will Need

1 large cereal box, Colored cardstock or Construction Paper
Shells, Kinetic Sand
Light Green Pipe Cleaners, Googly Eyes
Turquoise Paint, Silver Paint
Stones, String, X-acto Knife
Hot glue,
Scissors

Steps:

First you need to trace a cut-out on your box. We used a sharpie to make our lines and then used an x-acto knife (adults only) to cut out the center of the box. Cut out Cardboard Cereal Box. Now paint the inside of your box a turquoise blue color. Paint the outside of your box silver (to make it look like an aquarium). Now you can decorate your aquarium however you'd like! Here are the elements we added: Kinetic sand as a background on the bottom. We didn't try regular sand but regular sand would likely work too. The kinetic sand sticks together and holds in place so it's easy to work with. You could also use cereal like cheerios or a puff style cereal to make it look like sand. Green Pipe Cleaners – cut some strips of green pipe cleaners and glue to the bottom of your box to make it look like seaweed. Add Sand and Pipe Cleaners to Aquarium, Add Seashells to the Aquarium, Add Stones to bottom
Now it's time to add your fish! Print off this fish template to make these adorable fish for your cereal box aquarium. Now cut out your fish template and use it to trace your fish shapes onto your colored paper. We used orange, yellow and red cardstock. Glue on googly eyes to your fish. Take a small piece of string and tape it to the back of your fish.
Make Paper Fish for Aquarium. Now attach the strings to the top of your cereal box.

FUN RIDDLES

The day before
yesterday, I was 25
years old, and next
year I will turn 28.
How is it possible?

English Proverbs and Meanings

*** A drowning man will clutch at a straw.**

When someone is in a difficult situation, he will take any available opportunity to improve it.

*** A fool and his money are soon parted.**

Foolish people do not know how to hold on to their money.

*** Among the blind the one-eyed man is king.**

An incapable person can gain powerful position if others in the fray are even more incapable.

*** An eye for an eye and a tooth for a tooth.**

If someone does something wrong, then they should be punished by same degree of injury or punishment.

*** An ounce of protection is worth a pound of cure.**

A little precaution before a crisis hits is better than lot of firefighting afterwards.

*** A thing begun is half done.**

A good beginning makes it easier to accomplish the rest of the project.

Chicken Potli



Ingredients:

250 gm Chicken
1 medium Onion
1 Green Chilly
50 gm Garlic
25 gm Ginger

According to taste Salt
1 tsp Aromatic powder
3 drops Soya sauce
1/2 tsp Oyster sauce
200 gm Spring onion
6 Pieces Filo sheet

Method

Heat a pan with two tsp of oil and saute chopped garlic, onion, ginger and green chilly together. After a minute add chicken with all the spices and mix them properly, toss it well. Now add all the sauces and cook again for few minutes. Transfer the mixture into a bowl and allow it to cool. The mixture is ready now.

Prepare the potlis:

Now take a filo sheet into your hand and using your thumb and index finger make a circle and place the filling inside the potli and close the sheet using spring onion and tied carefully. Fry it in medium hot oil for about 5-6 minutes till it becomes golden brown. Serve it hot with black bean sauce or sweet chilly sauce. Enjoy!

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Red Velvet Pancake



Ingredients:

10 Cups All-purpose flour
1-1/4 Cup Sugar
2/3 Cups Baking cocoa
6 tsp Baking soda

4 tsp Baking powder
5 tsp Salt

Additional ingredients (for each batch)

2 Cups Buttermilk
2 Eggs
2 tsp Red food coloring
Butter and Maple syrup

Method

In a large bowl, combine the flour, sugar, baking cocoa, baking soda and salt all together. Place 2 cups in each of five resealable plastic bags or containers. Store in a cool, dry place for up to 6 months.

Prepare pancakes:

Pour the mixed ingredients into a large bowl. In a small bowl, whisk the buttermilk, eggs and food coloring. Stir into dry ingredients just until moistened. Pour batter by 1/4 cupful's onto a greased hot griddle; turn when bubbles form on top. Cook until the second side is golden brown. Serve with butter and syrup. Flip the dosa, lower the flame and cook for 2 to 3 minutes more. Serve hot with ghee or butter, toasted almonds, and freshly sliced fruits.